UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/030,402	05/20/2002	Sakae Shibusawa	04730/003001	8989

22511 7590 10/22/2004

OSHA & MAY L.L.P.
1221 MCKINNEY STREET
HOUSTON, TX 77010

EXAMINER	
ASSOUAD, PATRICK J	
ART UNIT	**PAPER NUMBER**
2857	

DATE MAILED: 10/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/030,402	SHIBUSAWA ET AL.	
	Examiner	Art Unit	
	Patrick J. Assouad	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 9/20/04

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-39 is/are pending in the application.

4a) Of the above claim(s) 27-32 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-26, 33-39 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 5/12/04 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/20/04 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-26 and 33-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Monson et al.** ('491) in view of **Hauwiller et al.** ('542).

Note: Applicant admits in his "Prior Art Technology"-section of his Specification that various optical-based soil measurement systems exist. And in the same section,

Applicant admits that it is known that the "degree of moistness of the soil" affects the aforementioned optical-based soil measurements.

4. **Monson et al.** disclose a soil analysis assembly and system. Figs. 1- 3 of **Monson et al.** are reproduced below. More particularly, **Monson et al.** disclose:

> The present invention relates to a soil analysis system for determining various soil characteristics. Various soil characteristics may include moisture content, organic matter content and the presence of nitrogen phosphate, potassium and other elements. The soil analysis system includes a plurality of testing assemblies for determining soil characteristics. The soil analysis system further includes a soil testing device or probe which is operatively inserted into the soil to support the testing assemblies. Preferably, the soil analysis system is used in cooperation with a positioning system and a data collection system for recording soil characteristic data based upon the geographic location to which the soil characteristic data relates. (Abstract, emphasis added)

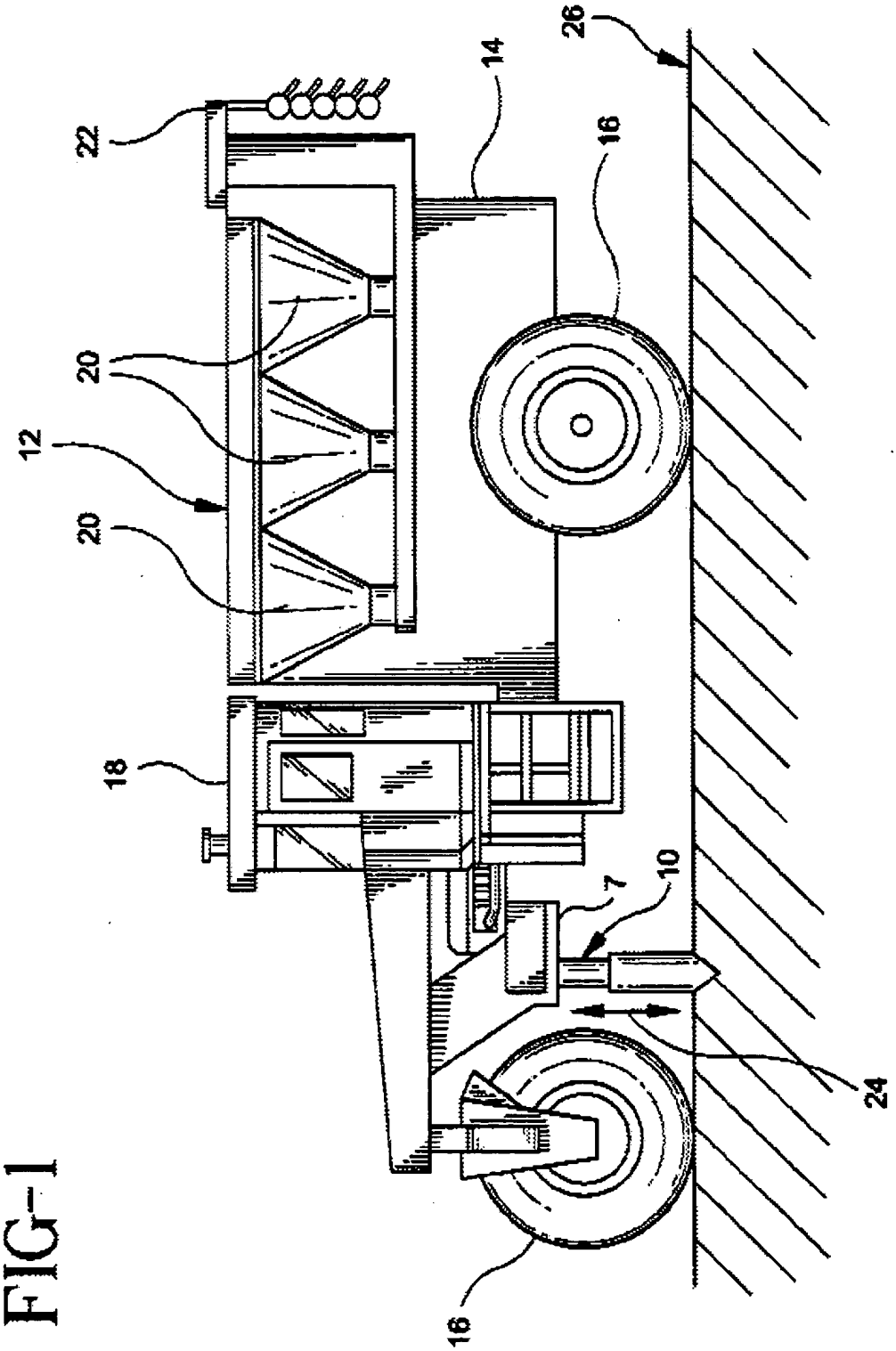

FIG-1

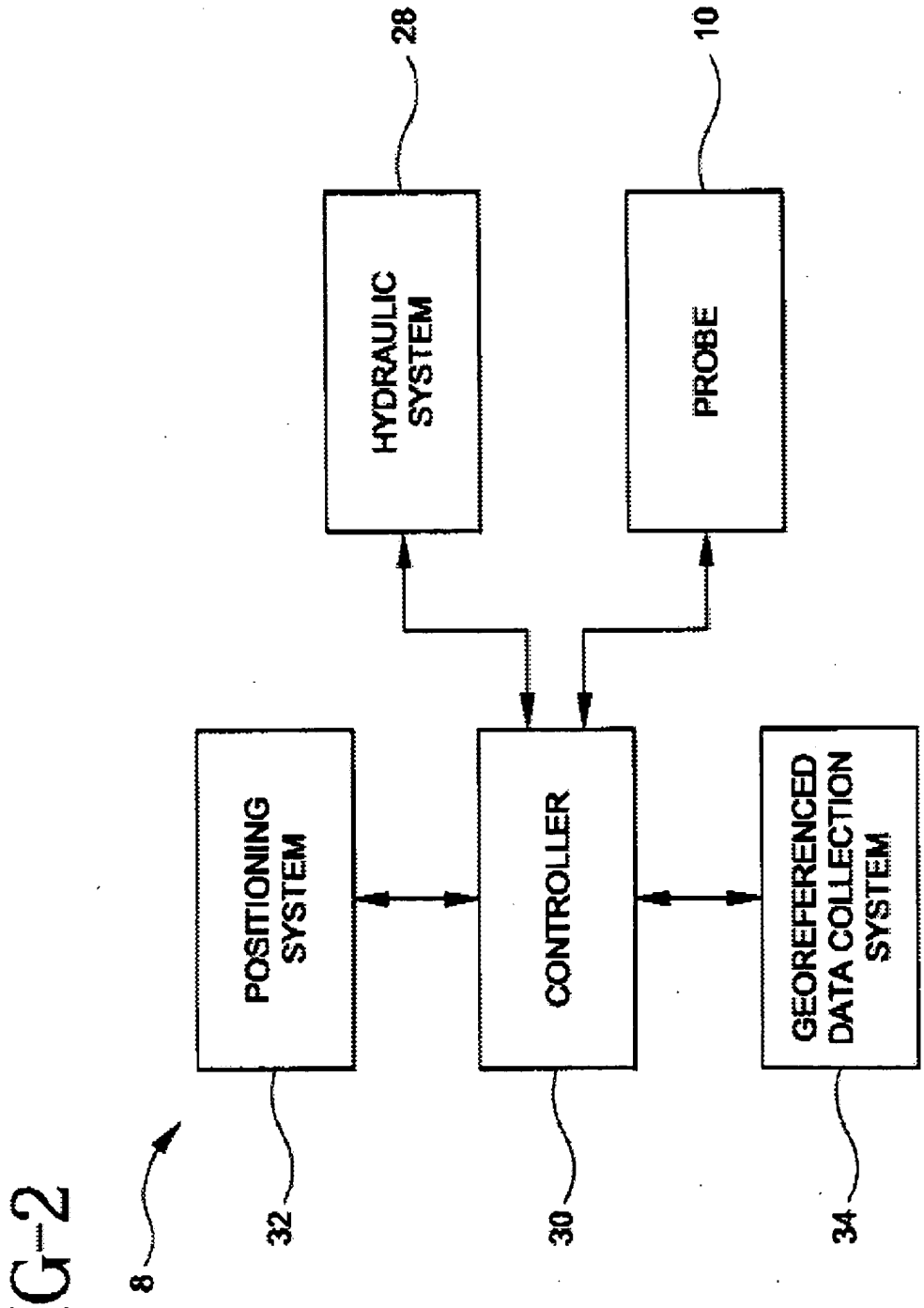
28
10
HYDRAULIC SYSTEM
PROBE
POSITIONING SYSTEM
CONTROLLER
GEOREFERENCED DATA COLLECTION SYSTEM
8
32
30
34

FIG-2

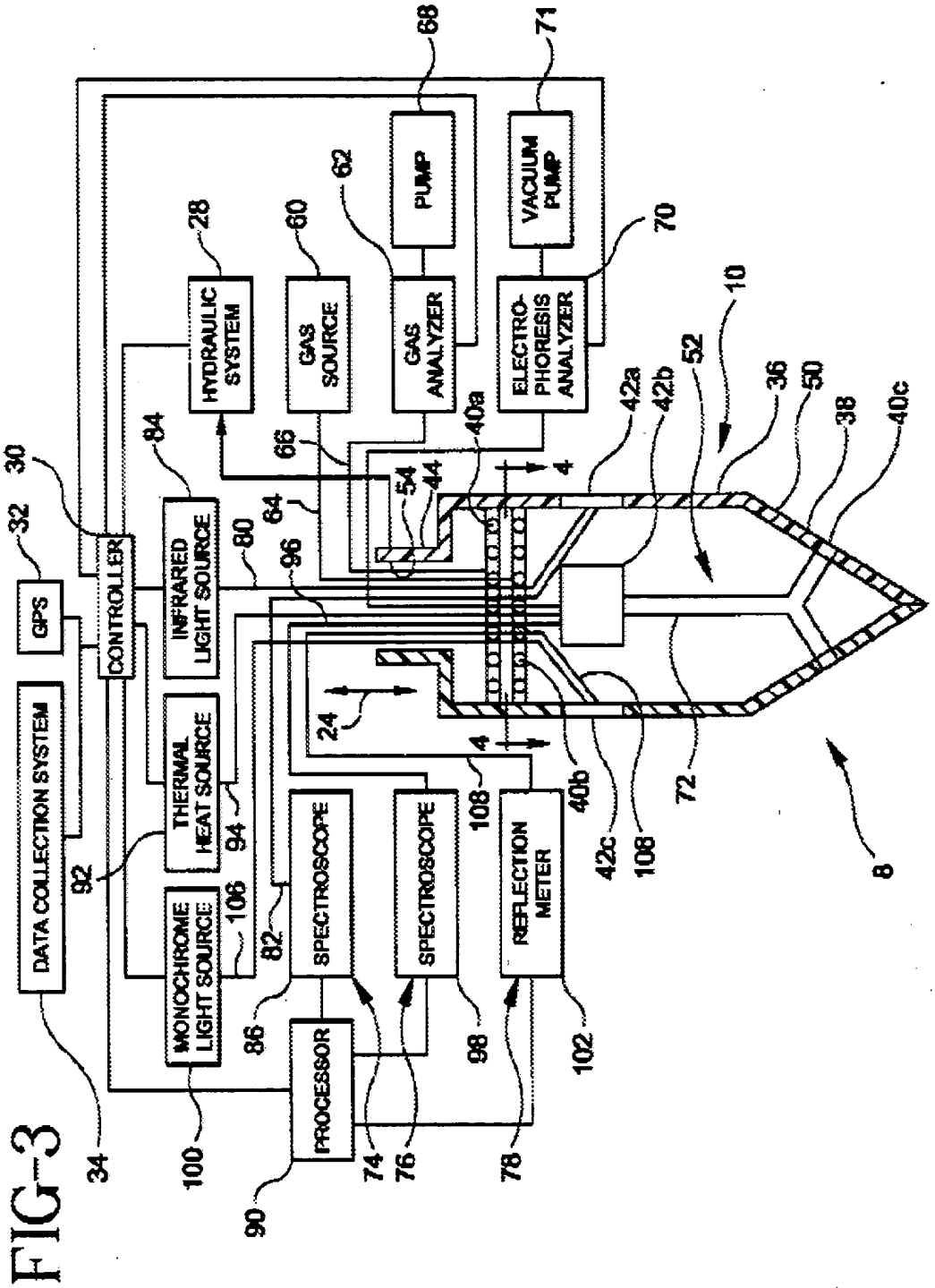
68
71
PUMP
VACUUM PUMP
62
28
60
70
HYDRAULIC SYSTEM
GAS SOURCE
GAS ANALYZER
ELECTRO-PHORESIS ANALYZER
10
52
36
50
38
40c
42a
42b
40a
66
54
44
4
30
84
64
80
96
32
GPS
CONTROLLER
INFRARED LIGHT SOURCE
24
4
THERMAL HEAT SOURCE
94
92
106
82
108
40b
42c
108
72
8
DATA COLLECTION SYSTEM
MONOCHROME LIGHT SOURCE
SPECTROSCOPE
SPECTROSCOPE
REFLECTION METER
86
98
102
34
100
PROCESSOR
74
76
78
90

FIG-3

5. The correspondence between the instant claimed invention and that of **Monson et al.** is as follows:

obtaining information related to a soil type and a water content of a measurement site or means for doing so, determining a model based on the soil type and the water content, acquiring measurement data using a soil sensor based on information related to at least one parameter selected from the soil type and the water content; and calculating the properties of the soil using the acquired measurement data in the model are all seen in the reproduced sections below and in at least Figs. 1-3 of **Monson et al.**:

From col. 3:

the data collection system 34 stores data collected from the testing assemblies for possible subsequent analysis and evaluation. The collected data is referenced relative to the field location at which the data is collected. Preferably, the collected data is georeferenced and is stored relative to the geographic latitude and longitude coordinates for the field position at which the data is collected. The controller 30 initiates operation of the hydraulic system 28 for operating the probe 10 at selected locations based upon a predetermined pattern. The positioning system 32 provides position data to the controller 30 for positioning the probe 10 for operation at the selected locations. Data collected from the probe 10 is then stored by the data collection system 34 relative to field location based upon information from the positioning system 32.

And from cols. 3-4 of **Monson et al.**:

In a preferred embodiment, the probe 10 supports various testing assemblies including reflectance testing assemblies, an electrophoresis testing assembly, and a chromatography testing assembly. The chromatology testing, reflectance testing and electrophoresis testing are used to isolate elements or minerals found in the soil and to analyze various soil characteristics.

Various reflectance testing assemblies may be used for the purpose of

analyzing moisture content, organic matter content as well as mineral composition of a soil sample. It is generally known that reflectance characteristics of the soil relate to soil texture, moisture content, surface roughness, iron oxide content and organic matter content. Additionally, certain nutrients have unique reflectance characteristics and produce a unique spectral image which allows the content of these nutrients to be analyzed for a particular soil sample. It is desirable to use a combination of tests for comparison for evaluating the influence of the various factors affecting reflectance for the purpose of isolating soil characteristics relating to moisture content, organic matter content and nutrient content. The results of the combination of testing assemblies may be used to provide a more accurate determination of soil characteristics. Although it is preferred to use multiple testing assemblies for determining soil characteristics, it should be understood that it is not necessary that each of the testing assemblies described be employed and the invention should only be limited by the claims appended hereto...

...The reflectance testing assembly 74 may be used to determine moisture and nutrient content and includes optical cables 80 and 82, an infrared light source 84, a spectroscope unit 86...

And from cols. 4 and 8 of **Monson et al.:**

...The reflected light from the soil sample is detected by the spectroscope unit 86 via optical cable 82. The reflectance at various wavelengths is analyzed for the purpose of analyzing different attributes of the soil sample. Different attributes of the soil sample are analyzed via a processing assembly 90 to determine the content of nitrogen, potassium, phosphorus and other elements as will be described herein. The soil characteristic data such as the content of nitrogen, etc. is stored in the data collection system 34 based upon the geographic location of the soil sample as determined by the global positioning system 32.

Additionally, soil moisture data may be used to factor in moisture content for the reflectance data to isolate the influence of moisture content on the reflectance data to isolate the organic matter content. Thus, a relative organic matter content may be derived for the soil sample which may be used for determining proper field treatments for maximum yield or performance.

6. The very minor difference between the instant claimed invention and that of **Monson et al.** lies in the claimed "model" or "modeling" step. **Monson et al.** do calculate soil properties based on a number of inputs; however, they do not explicitly use the term "model", but rather they use terms like "factor in" or "determine" or "correlate" or "derive" to adjust for the influence of moisture content on the collected soil reflectance data.

7. For example, from **Monson et al.** col. 8:

> ... soil moisture data may be used to factor in moisture content for the reflectance data to isolate the influence of moisture content on the reflectance data to isolate the organic matter content. Thus, a relative organic matter content may be derived for the soil sample which may be used for determining proper field treatments for maximum yield or performance. The relative organic matter content is stored by location by the data collection system 34 to build a database of field characteristics for various field locations for use in treating a field as illustrated by block 192.

8. **Hauwiller et al.** specifically teach in col. 6, lines 22-25, that their soil sample data "is used to build a soil profile through various mathematical modeling techniques for use by an expert system." See at least Figs. 2-3, element 216, the expert system, reproduced below.

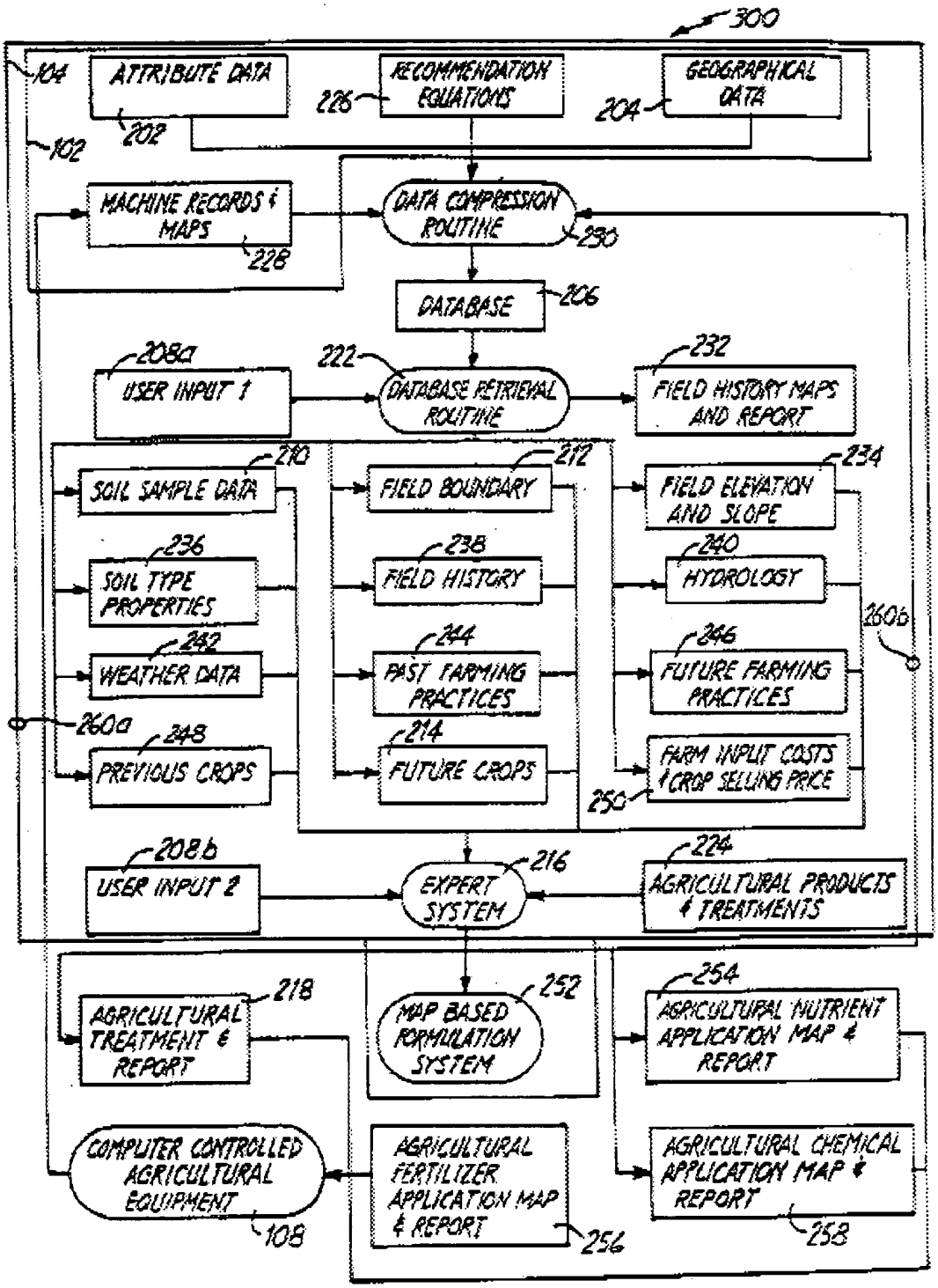
300
104
ATTRIBUTE DATA
202
226
RECOMMENDATION EQUATIONS
204
GEOGRAPHICAL DATA
102
MACHINE RECORDS & MAPS
228
DATA COMPRESSION ROUTINE
230
DATABASE
206
208a
USER INPUT 1
222
DATABASE RETRIEVAL ROUTINE
232
FIELD HISTORY MAPS AND REPORT
210
SOIL SAMPLE DATA
212
FIELD BOUNDARY
234
FIELD ELEVATION AND SLOPE
236
SOIL TYPE PROPERTIES
238
FIELD HISTORY
240
HYDROLOGY
260b
242
WEATHER DATA
244
PAST FARMING PRACTICES
246
FUTURE FARMING PRACTICES
260a
248
PREVIOUS CROPS
214
FUTURE CROPS
250
FARM INPUT COSTS & CROP SELLING PRICE
208b
USER INPUT 2
216
EXPERT SYSTEM
224
AGRICULTURAL PRODUCTS & TREATMENTS
218
AGRICULTURAL TREATMENT & REPORT
252
MAP BASED FORMULATION SYSTEM
254
AGRICULTURAL NUTRIENT APPLICATION MAP & REPORT
COMPUTER CONTROLLED AGRICULTURAL EQUIPMENT
108
AGRICULTURAL FERTILIZER APPLICATION MAP & REPORT
256
AGRICULTURAL CHEMICAL APPLICATION MAP & REPORT
258

Figure 3

9. And from col. 4, lines 21-24, of **Hauwiller et al.,** "soil sample data 210 may include soil test data in either systematic or random form of soil nutrient levels, soil pH, soil texture and characteristics, organic matter, etc." The Examiner explicitly associates "water content" of soil as being but one example of "soil sample data" of **Hauwiller et al.** because water content directly affects agricultural production yield as is commonly recognized. Also note element 240, "hydrology" and "soil type properties" 236 of Fig. 3 of **Hauwiller et al.**

10. And in col. 9 of **Hauwiller et al.,** we find further motivation to combine:

> Recommendation equations 226 are the mathematical formulas that express the relationship between existing field conditions and the desired crop yield (i.e., relate field data to desired output) for determining the amount of dispensing material, and may be derived from the empirical data sources or determined by an expert in the field of agricultural, as defined hereinbefore. Additionally, these recommendations equations 226 preferably are tailored to match the characteristics of the automated agricultural equipment 108, e.g. implemented in a manner such that the specific equipment of interest is capable of accurately responding to and meeting the characteristics specified by the recommendation equation(s) 226.

11. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the "mathematical modeling techniques" of **Hauwiller et al.** with the "on-the-go" (col. 2, line 18) soil collection and analyzer of **Monson et al.** because such a combination allows for proper fertilizer application by considering and compensating for the admittedly well-known influence of

moisture content on measured soil conditions, and ultimately on the overall calculated soil profile, to produce a better yield of crops and more profitability to the landowner.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick J Assouad whose telephone number is 571-272-2210. The examiner can normally be reached on Tues-Friday 6:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S Hoff can be reached on 571-272-2216. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patrick J Assouad
Primary Examiner
Art Unit 2857

pja